

Application No. 10/748,014
Amendment dated June 22, 2007
Reply to Office Action of March 23, 2007

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REMARKS

Please reconsider the application in view of the above amendments and the following remarks.

Claims 38-65 are pending in this application.

Claims 60 and 65 were amended for clarity. Claim 60 has been amended to read "containing diimine-based ligands". Support for these amendments may be found in at least the claims as filed and paragraphs [0336]-[0343]. Claim 65 has been amended to read "molar" ratio. Support for this amendment may be found in at least the claims as filed and paragraph [0441]-[0463]. New claim 66 has been added. Support for new claim 66 may be found in at least the claims as filed and paragraphs [0034]-[0036]. Applicant respectfully submits that no new matter has been added by these amendments.

Rejections under 35 U.S.C. § 112, Second Paragraph

Claims 38-44, 48-55, and 60-65 were rejected as indefinite under 35 U.S.C. § 112, second paragraph. The Examiner asserts that "methylalumoxane-activatable" (MAO-activatable) was not sufficiently described in the specification to allow one skilled in the art to determine the bounds of the claim. "MAO-activatable" is defined in paragraph [0255] as a compound which can be activated by MAO. "Activation" by MAO, in the context of polymerization, is well-known to one of ordinary skill in the art to refer to the abstraction of an alkide or halide from the MAO-activatable compound, forming a cation-like metal center. A "MAO-activatable" compound would therefore be understood by a person of ordinary skill in the art as a metal-containing compound comprising a halide or an alkide which can be abstracted by MAO. Further, paragraphs [0256]-[0353] recite examples of MAO-activatable compounds such as Group 15-containing component catalyst compounds, phenoxide catalyst

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compounds, or conventional transition metal catalyst compounds, and depict exemplary chemical structures of such MAO-activatable compounds. Because "MAO-activatable" is a term known in the art, the scope of claims 38-44, 48-55, and 60-65 is readily ascertainable. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 38-44, 48-55, and 60-65 under 35 U.S.C. § 112, second paragraph.

Claims 60 and 61 also were rejected as indefinite under 35 U.S.C. § 112, second paragraph. The Examiner asserts that the phrase "diimine-based ligands of group 8 to 10 metal catalyst compounds" was indefinite because it cannot be determined what the intended embodiment is. Claim 61 has been amended to read "Group 8 to 10 metal catalysts containing diimine ligands." The intended embodiments of claims 60-61 is now readily ascertainable. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 60-61 under 35 U.S.C. § 112, second paragraph.

Claim 65 was yet further rejected as indefinite under 35 U.S.C. § 112, second paragraph. The Examiner asserts that the scope of the claimed ratio cannot be determined, because the claim does not state a quantitative basis for the ratio. Claim 65 has been amended to read "molar ratio." As above, support for this amendment can be found in at least the claims as filed and paragraph [0441]-[0463]. The scope of the claimed ratio is now readily ascertainable. Applicant respectfully requests withdrawal of the rejection.

Rejections under 35 U.S.C. § 102(b)

Claims 38-50, 52-59, and 60-64 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,214,949 issued to Reddy *et al* ("Reddy"). To the extent that the rejection still applies to the claims as amended, the rejection is respectfully traversed.

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Reddy discloses the use of a catalyst system comprising a heterogenous transition metal catalyst, at least one (unsupported) unbridged metallocene compound, an alumoxane co-catalyst, an alkyl aluminum co-catalyst, an organosilicon selectivity control agent and optionally, a (unsupported) bridged metallocene, to make polyolefins with high molecular weight, high fractional melt flow index, and low xylene solubles. *See Reddy, Abstract, and col. 2, lines 26-33.* Nowhere does Reddy teach, show, or suggest that the metallocene component of the disclosed catalyst system is supported.

In contrast, claim 38 of the instant application recites a *supported, treated catalyst system* produced by a process comprising the steps of (a) forming a supported bimetallic catalyst system comprising a first catalyst compound and a second catalyst compound, where *both* the first and second catalyst compounds are *supported* on a common support material; and (b) contacting the supported bimetallic catalyst system with a methylalumoxane-activatable compound. For example, as described in the Examples, the TiCl₄ (Ziegler-Natta) catalyst is supported by mixing and heating with a silica slurry in heptane, and the metallocene is supported by the subsequent addition of the activated metallocene to the supported TiCl₄ catalyst, mixing for 1 hour, then removing the solvents to yield a fully supported bimetallic catalyst system. *See Preparation of the base catalysts A and B, paragraphs [0441]-[0444].* Yet further, claim 66 recites that *each particle* of support material includes *both* the first and second catalyst component.

The Examiner asserts that, in Reddy, contact of the supported Ziegler-Natta catalyst with the metallocene would *necessarily* result in at least some non-zero amount of metallocene becoming deposited on the surface of the supported Ziegler-Natta catalyst, because an adsorption/desorption equilibrium will exist between metallocenes in solution and those sorbed onto the solid surface. The Examiner asserts that the Reddy process of mixing a

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supported Ziegler-Natta catalyst with a solution of two metallocenes is therefore within the scope of claim 38. This assertion is respectfully traversed.

Firstly, as above, nowhere does Reddy show, suggest, or teach that the metallocene is supported. In contrast, Reddy recites *in every instance* a catalyst system comprised of two separate components, of which the Ziegler-Natta catalyst is clearly identified as supported, while *no mention* is made of whether the metallocene is supported. At column 5, lines 25-27, and at column 7, line 63 to column 8, line 3, Reddy discloses its invention as a combination of two particular types of catalysts. Specifically, Reddy requires that its catalyst system have a heterogeneous catalyst, an unbridged metallocene catalyst, and optionally, a bridged metallocene. Applicant respectfully notes that this does not teach support of the metallocene catalyst. Rather, Reddy merely discloses the use of a mixture of catalyst components, both homogeneous and heterogeneous, and does not distinctly teach, explicitly or inherently, the support of a bimetallic catalyst system, as required by claim 38, part (a). A claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628 (Fed. Cir. 1987); MPEP 2131.

Metallocenes are typically crystalline solids which are soluble in suitable organic solvents. One of ordinary skill in the art would assume that unless so explicitly stated, the metallocene is *unsupported* and therefore a homogeneous catalyst in solution. Significant research effort has been expended to effectively support metallocenes. The process of supporting metallocenes is therefore non-trivial, and contrary to the Examiner's statements, not merely governed by elementary concepts of adsorption equilibrium.

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In contrast, claim 38 and claims dependent from it claim a *supported catalyst system*. Claim 38(a) recites the *formation* of a supported bimetallic catalyst system, where both the first and second catalyst compounds are *supported* on a common support material. Further, new claim 66 recites the supported treated catalyst system of claim 38 wherein, on average, each particle of support material includes both the first and second catalyst component.

Because Reddy is absolutely silent on the matter of supporting the metallocene, Reddy cannot be said to anticipate claim 38 under 35 U.S.C. § 102(b). Claims dependent from claim 38 are patentable for at least these reasons. Accordingly, the withdrawal of this rejection is respectfully requested.

Secondly, in response to the Examiner's assertion that adsorption of metallocenes on supported Ziegler-Natta catalysts would necessarily exist in Reddy, Applicant respectfully asserts that the Examiner has no basis in fact and/or technical reasoning to reasonably support the determination that the metallocene *necessarily* adsorbed onto the surface of the supported Ziegler-Natta catalyst to produce a supported bimetallic catalyst under the conditions recited by Reddy.

Under Federal Circuit precedent, a rejection under 35 U.S.C. § 102 is improper when the cited reference does not contain each and every element of the rejected claim. *See Brown v. 3M*, 265 F.3d 1349, 1351 (Fed. Cir. 2001). Established case law allows an Examiner to rely on any of express, implicit, and inherent disclosures in rejecting claims under § 102 or § 103; however, to properly rely upon the theory of inherency, "the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in

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original). The burden then shifts to the Applicant to prove that the prior art does not necessarily possess the characteristics of the claimed invention. *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980).

There is a marked distinction in the art between mere adsorption and support of a catalyst. One of ordinary skill in the art may differentiate absorption as being a physical phenomenon whereas support is a chemical phenomenon. Reddy does not meet many of the criteria required to support an inference of supporting a metallocene.

Adsorption of a metallic species onto a support surface is reliant on many factors and has been described at constant pH by the Langmuir isotherm. According to the Langmuir isotherm, the adsorption of a catalyst solution onto a support surface relies heavily on the contact of the impregnating solution (homogenous metallocene solution) and the support, and is therefore dependent in part upon (i) solution concentration, (ii) support concentration, and (iii) time of contact.

As above, there is no disclosure in Reddy, whether explicit or inherent, of a bimetallic supported catalyst system. Reddy's catalyst system is a combination of a heterogeneous catalyst, an unbridged metallocene catalyst, and optionally, a bridged metallocene. The only teaching of how the metallocene is incorporated into the Reddy catalyst system lies in the examples. In the Examples 1 through Example 25, Reddy merely indicates formation of its catalyst system *in situ* by charging a steel cylinder with a mineral oil slurry of a conventional supported Ziegler-Natta catalyst, 4 mgs of an unsupported, *unactivated*, chlorided metallocene catalyst, propylene, and additionally other reactants for a timed pre-polymerization of *five seconds*, and then transferring the mixture to a reactor.

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The fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (citing *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981)). Rather, “[t]o establish inherency, the extrinsic evidence *must make clear* that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) (emphasis added).

Reddy clearly shows the addition of metallocene as a solid, not a solution into the transfer cylinder. In order for the metallocene to adsorb onto the support, it must first dissolve in a suitable organic solvent. For the *five second* timed prepolymerization, small (catalytic) amounts of the mineral oil suspension of the supported Ziegler-Natta catalyst, catalytic amounts of the solid metallocene, a solution of an activator in hexanes, comparatively excess olefin, and other reactants are in brief contact with each other. Consequently, the concentration of the dissolving metallocene is very low. Similarly, because catalytic amounts of the support are added, the concentration of the support is also low. Because the concentration of the catalyst is low, the concentration of the support is low, and the time of contact of the impregnating solution and the support is a mere five seconds, adsorption of the catalyst onto the support is disfavored under the Langmuir isotherm. Although the Examiner may assert otherwise, one of ordinary skill in the art would most certainly find that under such elementary concepts of adsorption, adsorption of the

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metallocene onto the supported Ziegler-Natta catalyst under the conditions of Reddy is highly disfavored.

Thus, because Reddy fails to disclose each limitation of claim 38, claim 38 is patentable in view of Reddy. Claims depending from claim 38, including claims 39-50 and 52-64, are also patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Regarding new claim 66, which depends from claim 38 discussed above, claim 66 further requires that each different catalyst compound that comprises the bimetallic catalyst is supported on a single type of support such that, each particle of support material includes both the first and second catalyst component. As above, Reddy does not disclose support of two catalysts on a support. Thus, because Reddy fails to disclose each limitation of claim 66, claim 66 is patentable over Reddy. Allowance of this claim is respectfully requested.

Additionally, Applicant respectfully requests that the Attorney Docket Number be changed to 2003U043.US.

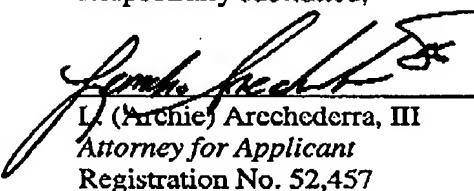
Applicant respectfully requests that all rejections be withdrawn and solicit a prompt notice of allowability. In the alternative, Applicant invite the Office to telephone the

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undersigned attorney if there are any other issues outstanding which have not been presented to the Office's satisfaction.

Respectfully submitted,

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Date


L. (Archie) Arcchederra, III
Attorney for Applicant
Registration No. 52,457

Univation Technologies, LLC
5555 San Felipe, Suite 1950
Houston, Texas 77056-2723
Phone: 713-892-3729
Fax: 713-892-3687